

The medical department should also be prepared to give advice concerning the services of specialists; the employee should be referred to men of ability and integrity and at the proper time for the best results.

There is an excellent opportunity in this work for the propagation of the right kind of health information at the time when it may do the most good.

Examination on return to work after illness is a health procedure worthy of a regular place in an industrial health program.

C. O. SAPPINGTON.

### Medicine

**ETIOLOGY of Rheumatic Fever**—Ever since the beginning of the bacteriological era some fifty years ago physicians have attempted to prove a microbic cause of acute rheumatic fever. For the interesting story of the successive organisms which have been incriminated, beginning with the anerobic bacillus of Achalmé, the reader is referred to the review by Swift and Kinsella.<sup>1</sup> Suffice it to say that nonhemolytic streptococci of one sort or another, especially the "diplococcus rheumaticus" of Poynton and Payne, have received especial support, although the most conservative modern opinion holds that the virus of rheumatic fever is as yet undetermined. Swift<sup>1</sup> studied the subject critically, and with the most careful methods of blood culture was able to recover nonhemolytic streptococci in less than 10 per cent of fifty-eight patients. Furthermore, the bacteria were not uniform, but represented different members of the so-called "viridans" group. It should be remembered that nonhemolytic streptococci are uniformly present in tremendous numbers in the upper air passages of every human being, both normal and abnormal;<sup>2</sup> they appear within twenty-four hours after birth. In accord with this fact it is found, in all laboratories where many blood cultures are made, that from time to time a positive yield of *s. viridans* is obtained regardless of the nature of the disease which is being investigated.

Rheumatic fever presents certain fundamental clinical differences from known nonhemolytic streptococcus infections such as *s. viridans* endocarditis. The pathological changes, as clearly pointed out by McCallum in his Harrington lecture,<sup>3</sup> are entirely different; the great tendency to renal lesions in streptococcus infections is absent in rheumatic fever, and the response to salicylates, often striking in the latter, is insignificant in the former.

It is with interest, therefore, that one reads the recent paper of Small<sup>4</sup> in which a nonhemolytic streptococcus, designated streptococcus cardioarthritidis, is advanced as the cause of rheumatic fever. The organism, which possesses the characteristics of many members of this group, was recovered in the

first instance from the blood of a patient with rheumatic fever. Later similar organisms were isolated from the throats of patients not only with acute rheumatic fever, but with chronic arthritis, acute nephritis, and other conditions. The original blood culture strain in large doses (25 cc. of 24-hour broth culture) produced arthritis and other lesions in rabbits. A serum prepared by immunizing a horse was used in a small number of patients. Its administration was followed usually by a marked improvement within one to two days, which in some cases was maintained for months.

Interesting as these results appear to be, a careful analysis of the work yields no final evidence either that the "streptococcus cardioarthritidis" is the cause of rheumatic fever or that sera prepared from it have a specific effect. The occasional recovery of a streptococcus from the blood, as pointed out above, means little; the recovery of nonhemolytic streptococci from the throat—their normal habitat—means even less. It has been shown repeatedly that any streptococcus injected into rabbits in large quantities produces joint lesions and other changes which have no specific relationship to the pathology of rheumatic fever.<sup>5</sup> The therapeutic effects of Small's serum immediately raise the question of nonspecific action of foreign protein. Results apparently as striking have been reported in large series of cases by Miller,<sup>6</sup> Cecil,<sup>7</sup> and many other workers after injection intravenously of killed typhoid bacilli and other substances.

In brief, before accepting the etiological rôle of the *s. cardioarthritidis* in rheumatic fever one would need information about the frequency of this organism in the throats of the population in general, evidence should be forthcoming that the bacteria produce the specific lesion (Aschoff body) in animals, and finally it must be shown that better results are obtained therapeutically with the immune serum than with plain horse serum, a question at best difficult to decide in view of the variable natural course of the disease.

Meanwhile the matter has already received newspaper publicity. It behooves physicians to adopt a most conservative attitude and to await the results of large series of cases treated under careful hospital control and followed over a considerable period of time before subjecting their patients with rheumatic fever and chronic arthritis to treatment with antistreptococcus sera.

ARTHUR L. BLOOMFIELD.

**USE and Abuse of Alkaline Waters**—The widespread use of bottled alkaline waters in California has assumed such proportions that it would seem wise for physicians to survey the practice rather critically.

To what extent has this usage arisen as a result of medical prescription and direction, and to what extent from commercial advertising?

If we as physicians are responsible are we fully

1. Swift, H. F., and Kinsella, R. A.: Jour. Exper. Med., 1917, Vol. 19, p. 381.

2. Shibley, G. S., Hanger, F. M., and Dochez, A. R.: Jour. Exper. Med. 1926, Vol. 43, p. 415.

3. McCallum, W. G.: Jour. Amer. Med. Assn., 1925, Vol. 84, p. 1545.

4. Small, J. C.: Amer. Jour. Med. Sciences, 1927, Vol. 173, p. 101.

5. Cecil, R. L.: Jour. Exper. Med., 1916, Vol. 24, p. 739.

6. Miller, J. L., and Lusk, T.: Jour. Amer. Med. Assn., 1916, Vol. 67, p. 2010.

7. Cecil, R. L.: Archives Internal Med., 1917, Vol. 20, p. 951.

convinced that the practice is desirable? What harm and what virtue is there in it? Are there well-recognized disorders and diseases which may be relieved by subjecting the body tissues to a rather continuous alkaline bath and, if so, should definite quantity and time limits be designated?

Or have we been drifting into easy acquiescence, thinking there may possibly be some good, or at any rate little harm in such waters, satisfied that our arthritic or hypertension patients have something to play with even though they may have carried away the conviction that a large and continuous consumption is greatly to be desired and is a measure of first therapeutic importance?

It is not uncommon to find patients with hypertension, many with definite impairment of kidney function, using one or two quarts of some popular alkaline water daily for periods of one or two years, believing firmly that this practice is necessary and even life-saving. Some of these people have adopted the usage of such waters because they have read certain advertising literature—too many, perhaps, owing to the direction and encouragement of their medical advisors. There is apparent a great popular misconception and bugaboo about "acid conditions" alleged to exist in the human body and a general tendency to ascribe to such nameless disorders a multitude of symptoms and dysfunctions that by careful analysis can be explained otherwise.

The conditions of acidosis, alkalosis, and the maintenance of the acid-base equilibrium in the body are only beginning to be understood. Much more careful experimental work remains to be done before we can be too dogmatic on the subject. There seems to be fairly general agreement, however, that with normal renal function the mechanism of neutrality regulation is very efficient and any excess of alkali is excreted and otherwise compensated for without any disturbance of the acid-base equilibrium. But in patients with disturbed renal function it is not difficult to induce an alkalosis, even when a preceding state of acidosis has existed, as such kidneys may be as inefficient in getting rid of an excess of alkali administered as they were in excreting the normal excess of acid. Alkalosis and tetany have been brought about in certain patients on therapeutic alkaline régimes. Recent experimental work on animals has shown that on highly alkaline régimes blood cells, albumen, and casts may appear in the urine, while with proportionate amounts of acids such conditions do not obtain. Continuously neutral or alkaline urines may also favor the formation of renal calculi. While there is no statistical evidence to prove this contention, at least our renal specialists uniformly attempt to keep the urine acid even to the extent of administering acids as a prophylaxis.

The question also naturally arises as to the final effect on the gastrointestinal tract and the processes of digestion of a continuous neutralization of the hydrochloric acid. If a specific object is to be obtained, such as the control of a peptic ulcer, we may accept certain harmful effects of an alkaline régime, if the cost is not too high, for the sake of the greater good accomplished, just as we do in the use of mercury in the control of syphilis. The use of alkaline waters seems desirable and even benefi-

cial in the acidosis of acute infections, in some acute abdominal upsets with vomiting, in certain bladder and renal pelvic conditions, and for symptomatic purposes in many disorders. But the advisability of their use over a considerable period of time and in many of the more chronic metabolic diseases would seem questionable.

FRED H. KRUSE.

### Neurosurgery

**LOCALIZATION of Tumors of the Brain—** In the early days of surgery of the nervous system the surgeon was purely an operator acting under the guidance of the neurologist, who took the responsibility for the localization of the lesion and for the extent of the operative procedure. Today there are many men who devote most or all of their time to neurosurgery, and, as a result of this specialization, technique has improved and operative mortality is much lower. In a constantly increasing number of patients it is possible to observe gross pathological changes in the living tissues, and to correlate them with the clinical findings. But before a tumor can be exposed at operation it must be localized. The neurologist was at first almost entirely dependent on the history and the clinical findings in making his diagnosis and localization. Valuable help has come from the roentgen ray, and stereoscopic films of the skull now reveal much that was not seen in the old plates. Calcification in tumors is demonstrated quite frequently; it is no longer difficult to determine whether the sella turcica shows pathological changes; proliferation of the skull over a dural tumor may be an ingrowth of new bone, impossible to detect except with the roentgen ray; and localized erosions of the skull are frequently significant.

The most important advance came with the introduction of cerebral pneumograms or ventriculograms by Dandy of Baltimore in 1918. Cerebrospinal fluid is withdrawn from the ventricles, and air is injected in its place. Roentgen rays then give a picture of the ventricular system, because the air casts no shadow. All tumors of the brain which give symptoms of pressure produce distortion or change in the size, shape or position of the ventricles. Dandy says that ten years ago less than 50 per cent of tumors of the brain could be exposed at operation; that now exposure is possible in 65 per cent because of better roentgen rays, better surgery and increased experience; and that *all* the remaining 35 per cent can be localized by the cerebral pneumogram. Have others been able to confirm this statement? Grant<sup>4</sup> has collected 392 cases from the records of several neurosurgeons. The method was of value in 311 cases, but in 218 it confirmed a neurological diagnosis, or was unverified, or ruled out a suspected tumor. Ninety-three tumors were localized and exposed at operation solely through the aid of the pneumogram. There were errors of technique in 10 per cent of the cases, and the mortality was 8 per cent. But the mortality of unlocalized tumors is 100 per cent, and of the ninety-three tumors which could not have been local-

4. Grant, Francis C.: Ventriculography, Arch. Neurol. and Psychiat., 14:513 September, 1925.